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EXAMINER

RUDE, TIMOTHY L

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 05/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/739,975

Applicant(s)

FUKUSHIMA ET AL.

Examiner

Timothy L Rude

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION*****Drawings***

The drawings are objected to under 37 CFR 1.83(a) because they fail to show cross rubbing sifted by  $2\theta_{OA}$  in Figure 7(a) as described in the specification on page 10, lines 34-35. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 14-18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As to claim 14, the recitation "and *quenching* direction of a batonnet" is not enabled (defined) in the specification. Appropriate correction is required.

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As to claims 15-18, they are dependent upon claim 14 above.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

2. (e) the invention was described in-

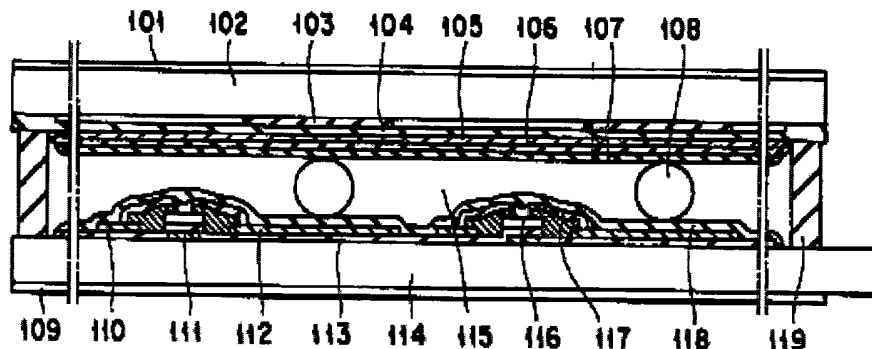
(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or  
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by  
Saishu et al (Saishu) USPAT 5,936,689.

As to claim 8, Saishu discloses in Figure 1 (col. 6, line 60 through col. 8, line 45), a liquid crystal display element comprising: a first substrate, 114; a switching element disposed on said first substrate; a second substrate, 102, counter to said first substrate; a first alignment layer formed over said switching element, 118; a second alignment layer, 107, formed over said second substrate, wherein said first and second alignment layers are rubbed in rubbing directions (col. 7, lines 35-40); a light modulating layer, 115, disposed between said first and second substrates wherein the light modulating

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layer comprises an anti-ferroelectric liquid crystal material having a thresholdless voltage-transmittance characteristic (col. 7, lines 43-45); and a filter, 104, formed on said second substrate, wherein said filter allows specific wavelengths of light to pass.

**FIG. 1**

As to claim 9, Saishu discloses the liquid crystal display element of claim 8 wherein the anti-ferroelectric liquid crystal material (col. 7, lines 43-56) is subject to an alignment process (Applicant's phase comprising Iso, SA and SC).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being anticipated by Tanaka, JP 04-371925, provided by Applicant.

As to claim 1, Tanaka teaches in Drawings 1-3, a liquid crystal display element comprising: a first electrode substrate having a first transparent substrate, 1, a first electrode, 4, formed on said first substrate, and a first alignment layer, 9, formed on said first substrate so as to cover said first electrode; a second electrode substrate having a second transparent substrate, 2, a second electrode, 5, formed on said second substrate, and a second alignment layer, 10, formed on said second substrate so as to cover said second electrode; and a light modulating layer, 6, of an anti-ferroelectric liquid crystal material (Constitution) which is sandwiched between said first and second electrode substrates covered with first and second alignment layers and which has a thresholdless voltage-transmittance characteristic, wherein said first and second alignment layers are combined with said liquid crystal material so that the angle between the rubbing directions is 6.8 degrees (col. 3, para 0013) (narrow range includes Applicant's shifted angle between the extending direction and an optical axis of a batonnet is within  $\pm 1$  degree). Applicant's Figure 3 shows the shifted angle between the extending direction and an optical axis of a batonnet,  $(\theta_{OA}-\theta_B)$ , is within  $\pm 1$  degree for all examples where the angle of the optical axis,  $\theta_{OA}$ , is less than 7 degrees (half the 14 degree angle between the rubbing directions). Tanaka's angle between the rubbing directions is only 6.8 degrees which is much less than 14 degrees, so the resulting shifted angle between the extending direction and an optical axis of a batonnet will be within  $\pm 1$  degree, per Applicant's Figure 3.

Tanaka is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to establish a difference between the rubbing

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directions of 6.8 degrees (resulting in Applicant's shifted angle between the extending direction and an optical axis of a batonnet within  $\pm 1$  degree, per Applicant's Figure 3) in order to improve contrast (Constitution) at the time of multiplex driving.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Tanaka to adjust the difference between the rubbing angle directions to 6.8 degrees resulting in a shifted angle between the extending direction and an optical axis of a batonnet within  $\pm 1$  degree.

As to claim 2, Tanaka teaches the liquid crystal display element as set forth in claim 1, wherein the angle between the rubbing directions is 6.8 degrees, thereby improving contrast (Constitution) at the time of multiplex driving due to the high uniaxiality of the optical axis, 121, of the antiferroelectric phase liquid crystal molecules, 111, (evidence that the optical axis of a batonnet deposited from said first electrode substrate is substantially coincident with the optical axis of a batonnet deposited from said second electrode substrate, thereby achieving the contrast improvement of Tanaka).

Tanaka is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to adjust the optical axis of a batonnet deposited from said first electrode substrate is substantially coincident with the optical axis of a batonnet deposited from said second electrode substrate to improve contrast at the time of multiplex driving.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Tanaka to adjust the optical axis of a batonnet deposited from said first electrode substrate is substantially coincident with the optical axis of a batonnet deposited from said second electrode substrate.

4. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka, as applied to claims 1 and 2 above, in view of Nakamura, USPAT 5,686,019.

As to claims 3 and 4, Tanaka discloses a liquid crystal display element as set forth in claims 1 and 2.

Tanaka does not explicitly disclose an element, wherein said first and second alignment layers have a surface tension of 49 dyn/cm to 53 dyn/cm.

Nakamura teaches in Example 1 (col. 16, lines 65-69) the use of a surface tension of 50 dyn/cm to establish uniform alignment and improve contrast (col. 17, lines 25-31). Nakamura also teaches in Example 9 (col. 20, lines 64-67) the use of a surface tension of 49 dyn/cm to establish uniform alignment and improve contrast.

Nakamura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add alignment layers having surface tension in the range of 49 dyn/cm to 50 dyn/cm (overlaps Applicant's range of 49 dyn/cm to 53 dyn/cm) to establish uniform alignment and improve contrast.



Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Tanaka with the alignment layer surface tension range of Nakamura.

As to claims 5-7, Tanaka discloses a liquid crystal display element as set forth in claims 1 and 2, and Tanaka in view of Nakamura discloses a liquid crystal display element as set forth in claim 3.

Tanaka does not explicitly disclose a liquid crystal display element as set forth in claim 1, wherein said first electrode substrate is an array substrate comprising: a plurality of scanning lines and signal lines, which are provided on said first substrate in the form of a matrix; switching elements, each of which is formed at a corresponding one of the intersections between said scanning lines and said signal lines, one end of each of said switching elements being connected to a corresponding one of said signal lines, each of said switching elements being open and closed in response to a signal of a corresponding one of said scanning lines; pixel electrodes, each of which is connected to the other end of a corresponding one of said switching elements; and said first alignment layer formed on said first substrate so as to cover said pixel electrodes, and said second electrode substrate is a counter substrate comprising a counter electrode formed on said second substrate, and said second alignment layer formed on said second substrate so as to cover said counter substrate.

Nakamura discloses in Figure 4 (col. 15, lines 48-57) a matrix type LCD element designed to overcome crosstalk and response speed problems while reducing defects (col. 1, lines 44-52) in TFT-type LCDs.

Nakamura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a matrix type LCD element designed to overcome crosstalk and response speed problems while reducing defects in TFT-type LCDs.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Tanaka with the TFT matrix design of Nakamura.

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saishu, as applied to claim 8 above, in view of Tanaka.

As to claim 10, Saishu discloses the liquid crystal display element of claim 8.

Saishu does not explicitly disclose an element, wherein said first and second alignment layers are rubbed in a direction which is substantially parallel to a direction 1 shifted from the normal direction of said light modulating layer and wherein the rubbing direction of said first alignment layer is different from the rubbing direction of said second alignment layer.

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Tanaka teaches an element, wherein said first and second alignment layers are rubbed in a direction which is substantially parallel to a direction 1 shifted from the normal direction of said light modulating layer and wherein the rubbing direction of said first alignment layer is different from the rubbing direction of said second alignment layer (col. 3, para 0013, Purpose and Constitution) to improve contrast.

Tanaka is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add rubbing directions in different directions to improve contrast.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Saishu with the rubbing directions of Tanaka.

As to claim 11, mere alteration of the rubbing direction angle to about 10 degrees is not considered patentably distinct. If the Applicant does not agree, a restriction might be appropriate.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saishu in view of Tanaka as applied to claims 8 and 10 above, and further in view of Nakamura.

As to claims 12 and 13, Saishu discloses the LCD element of claim 8 and Saishu in view of Tanaka discloses the LCD element of claim 10.

Saishu in view of Tanaka does not explicitly disclose an element wherein the surface tension of each of said first and second alignment layers is between about 49 dyn/cm and about 53 dyn/cm.

Nakamura teaches in Example 1 (col. 16, lines 65-69) the use of a surface tension of 50 dyn/cm to establish uniform alignment and improve contrast (col. 17, lines 25-31). Nakamura also teaches in Example 9 (col. 20, lines 64-67) the use of a surface tension of 49 dyn/cm to establish uniform alignment and improve contrast.

Nakamura is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add alignment layers having surface tension in the range of 49 dyn/cm to 50 dyn/cm (overlaps Applicant's range of 49 dyn/cm to 53 dyn/cm) to establish uniform alignment and improve contrast.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Saishu in view of Tanaka with the alignment layer surface tension range of Nakamura.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7724 for regular communications and (703) 308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



Timothy L Rude  
Examiner  
Art Unit 2871

TLR  
May 6, 2002



TOANTON  
PRIMARY EXAMINER